

Advancements in Web Typography (WebFonts and WOFF)

Aaron A. Aliño

Graphic Communication Department

California Polytechnic State University

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Chapter I: Introduction

When it comes to the control one has in designing and creating content for the World Wide Web, typography should be no different. Print designers have had the advantage for a long time over their ability to choose exactly how type is printed, limited only by their imagination and the mechanical limits of setting and printing type. Web designers, on the other hand, have been held back by the inherent hardware and software limitations associated with web design and font selection. What this means is that web designers have not been able to control type exactly the way they want. Web designers have been limited to fonts that can safely be displayed on most computers and web browsers. If web designers wanted to display type with a special font, they had to resort to a workaround that was not always effective.

Web designers should have the same absolute control over typography as print designers. Control of web typography has gotten much better compared to the early days of web design, but

considering how powerful and robust computers and web browsers are now, it seems unfortunate that control over web typography is so primitive

That has changed now. Now new features in some web browsers have allowed for the web designer to control the exact type they want. To understand the importance of how substantial this feature is, a better understanding of the development of web typography is needed.

Web typography with regards to design controllability has definitely gotten better since the earlier days of the web. With the advent of cascading style sheets (CSS), web designers have had the ability separate the style elements of a webpage from the content, enabling them to have greater and more precise control over how a website is displayed. Type could be controlled, changing the format as one would in a similar fashion within word processors. But type was still limited in the sense that web designers could not always use the exact typeface they wanted. A fancy, licensed font would be not even display in a web browser unless every person who visited that site also had that same font installed on their computer. A designer could design a site with a typeface that they have installed on their computer. It might display fine on their own computer, but looking at the site on another computer that does not have that typeface installed would result in the web browser reverting back to a basic system font. The designer's intent to have that site be displayed with a certain look would be destroyed, and their hard work would be put to waste.

Enter the concept of WebFonts—fonts that are stored on a website's server and can be displayed on the site from any computer and on browsers that support WebFont rendering. With most major web browsers supporting this feature now, web designers now have a much greater scope of type design with which they can work. Because this concept is still in its developmental stages, there are still some drawbacks to WebFonts, such as lack of standardization and licensing issues. But when compared to the basic way of controlling type in web design, WebFonts offer a greater

level of design control that was impossible before its inception. With WebFonts web designers can now use any typeface they wish and actually have the font display properly on any machine that has a browser that supports WebFonts. The Web Open Font Format (WOFF) is one type of webfont implementation that has recently been developed by the Mozilla Corporation.

For the average person unfamiliar with web design or typography, the advent of a new level of typographic control offered by webfonts may not seem worth investigating. They are just words, after all. The evidence is apparent – in the brands people are loyal to (Coke or Pepsi) and the words we read in print and on the web (favorite newspaper or magazine and bookmarks and home pages in web browsers). Typography is everywhere, and it is the basis by which people communicate information in print and through the Web.

Having the ability to control the look and feel of communication through words in web design seems like a valid reason to study the potential that the Web Open Font Format offers. The purpose of this study is to prove that WOFF has the potential to become a standard for web typography design and control. Being a relatively new development though, extra caution must be taken when undergoing this study. Through the use of specialized interviews from established web and typography designers, observations were made from their insightful comments that helped determine the viability of WebFonts. The interview responses were categorized as positive, negative, or neutral responses, and then given numeric values as a way of quantifying the research data. If WebFonts and WOFF are as good as they seem, this study will be thorough enough to draw a conclusion about this topic. This study would leave no doubt that webfonts and WOFF represent the future of web typography.

Chapter II: Literature Review (Overview of Web Typography)

The Beginning of Web Typography

The basis of typography is “the art of ameliorating that mass production and conveying that more information less expensively, with grace,” as defined by Rosemary Sassoon, who has written several books covering handwriting and type. This statement holds true not only for printed typography, but typography on the web as well. With the advent of desktop publishing, people have been confusing the visual appeal of type with readability. A children’s book that contained a line width of 100 characters and insufficient leading will appear cramped and harder to read than a calculus book with shorter and easier to read line length. Again, this typography observation holds true for typography displayed on computer displays. What is disheartening is that there was almost no control of typography in the earlier version of web browsers. Compare this fact to old typesetting systems which would not let a person type until they defined not only the typeface but also size, page width, and leading. Even when HTML added the feature to provide basic typographic controls, they are still ineffective (Sassoon).

There were some workarounds to the lack of typographic control in earlier web browsers, but they were still ineffective. David Siegel, one of the progenitors of web design, had developed a way of controlling type leading (the spacing of successive lines of text) with one-pixel gif images, but during that time many people did not even enable image rendering in their browsers due to their slow connection speeds. For those people who did not enable image rendering in their browsers, this gif workaround did not work, and actually turned pages using this workaround to be an unreadable block of text (Sassoon).

Type leading was not the biggest problem with earlier web typography. Type size and the differences in browsers rendering type was also a problem. For example, a person with poor eyesight viewing the computer screen might increase the type size to increase legibility. Type size on Windows and Macintosh computers displayed very differently, even if they were given the same value. Foreshadowing, or anticipating the amount of content was also a problem with web typography. With printed books, the length of a chapter and thickness of a book can give the reader a sense of length, but there is no such indicator for web typography. Sassoon noted that the key to good typography on the web is not to focus on mirroring the techniques that print typographers use to spec type, but to focus on document readability (Sassoon).

There are some rules that designers of web typography should follow to make their documents as readable as possible. First they must consider that, unlike books that are most often read serially, websites are dynamic pages that display chunks of text and are seldom read in order. Type must also never be defined in absolute terms, which may prevent readers from changing the size of the type if needed, such as for accessibility purposes. Then there is the issue of the actual typeface. Early browser specifications did allow for the definition of specific typefaces, but designers were limited to the universally readable and available typefaces on all computer platforms and web

browsers. If a designer defined a typeface to display on a webpage that was not installed on the computer displaying that webpage, the type would render on the page completely unreadable, and the person using that computer was out of luck (Sassoon).

The control of line width and page width was also very difficult to control for web designers, which can be defined in three different places: in the general web page code, in the style sheet code, and in the default browser behavior. If any of these were inconsistent with each other, text would often render unreadable. The use of tables to define absolute widths and heights was an earlier workaround for these inconsistencies, and seldom worked. Different browsers and different platforms would all render these tables differently. For the visually impaired, the fact that tables were read serially meant that the content within the tables was often unintelligible (Sassoon).

The practice of displaying text as graphics was another unsuccessful attempt at trying to gain control of web typography, which is pointed out by Sassoon. Although the appearance of type could be absolutely controlled by the designer, there were many reasons why this was bad practice. One of the major pitfalls of this practice was accessibility. If for some reason the graphic was not rendered by the web browser, the text would not be displayed. The alternate text property of images did allow some text-based information to be contained with the image, but was useless when the image was not even loaded. Text contained in a graphic was also useless if the user wanted search for text, unless the designer defined text in the alternate text that was specific enough to be searchable. There is also the issue of load times. When compared to text, graphics load much slower, making the practice of displaying text of graphics even less effective (Sassoon).

There were even some alternatives to avoiding the constraints of viewing type on actual webpages. The portable document format (PDF) developed by Adobe was one alternative to

displaying type in a way that could be controlled effectively by the designer and displayed correctly for the user. But since PDF's required additional software requirements to display, it was impractical to completely disregard the use of widely used web browsers (Sassoon).

One of the most important points in controlling web typography has to do with non-Latin characters. English is not the only language in the world, and a large part of the world communicates in languages other than English. Some of the typographic rules for English and other Latin-character based languages do not apply to non-Latin based languages. Having as much control of type with non-Latin character based languages is an important requirement in the development of controlling web typography (Sassoon).

The World Wide Web Consortium

In the long lasting effort to develop high quality standards for the World Wide Web, the World Wide Web Consortium (W3C) has been at the forefront. Information about the organization's background, structure, mission, and standardization process are all published on their website. By bringing diverse stakeholders together and using a consensus-based process to write and develop W3C Web standards, they are one of the few advocates of improving the standards of quality on the Web. The W3C promotes all users of the Web including developers, application builders, and the general public to contribute in the standardization process, providing input and reviewing proposed standards. The W3C was founded in 1994 by the inventor of the World Wide Web, Tim Berners-Lee, and has since grown into an international organization. The W3C has largely been responsible for developing standards that are in place today, such as cascading style sheets (CSS) and the advanced typographic controls that are now a feature in CSS (W3C).

Cascading Style Sheets (CSS)

First developed in 1996 and standardized by the W3C shortly thereafter, cascading style sheets (CSS) have been one of the main methods of formatting elements within webpages, including typography. Since its beginning, there have been feature additions that have resulted in improved versions. All of the specifications of CSS are published on W3C's website. The CSS level 1 (CSS1) developed in 1996 contained properties for fonts, margins, and colors that are required by all webpages using CSS. CSS level 2 revision 1 (CSS2.1) contains all of CSS1 and adds absolutely positioned elements, automatic numbering, page breaks, right to left text, among other features. CSS level 3 (CSS3) is still under development and includes all of CSS2.1 specifications in addition to new selectors, advanced backgrounds and borders, vertical text, user interaction, speech, full support for WebFonts, and more (W3C).

WebFonts

WebFonts are defined as fonts that are able to be downloaded and displayed by a browser without the need to install the font on the client's operating system. The complete specifications for WebFonts can be found through W3C's website. Specifications are required to be defined through CSS to display the font, and an actual font file is required to be downloaded and displayed through a web browser. There have been several different font formats developed and used as WebFonts. Embedded OpenType (EOT) was developed by Microsoft for Internet Explorer. Compact Font Format was developed by Adobe for the SVG Viewer. TrueType and OpenType fonts are compatible with Safari, Mozilla Firefox, and PrinceXML (a computer program that converts HTML and XML files into PDF files). With so many different font formats being used as WebFonts on different browsers, there has been a struggle to develop WebFont standards for all operating systems and web browsers (Lilley).

The WebFonts Working group was established in March, 2010 to develop the specifications for interoperable fonts on the Web. The group's main goal is to standardize the Web Open Font Format (WOFF), a method of displaying OpenType and TrueType fonts in web browsers. The group's complete charter is available through W3C's website (Lilley).

In September 2009, Jonathan Kew, a typesetting software developer working for the Mozilla Corporation, created open-source sample code for conversion between OpenType/TrueType and WOFF. A month later, Mozilla Firefox added experimental WOFF support. And in January, 2010 Firefox 3.6 became the first production browser to fully support WOFF. There is some software that has been developed to support WOFF. The font editor, fontforge, added support to directly export as WOFF, and wofftools is open-source software that provides tools such as WOFF validator, WOFF inspector, and a CSS generator. There are now also several commercial type foundries that have licensed typefaces available in WOFF (Dagget).

The Web Open Font Format (WOFF)

Developed by Jonathan Kew, Tal Leming, and Erik van Blokland, WOFF was first published in September, 2009. The complete specification for WOFF is published on Mozilla's website. The specification is introduced as a font file that is compressed and designed for web use. The WOFF is based directly on the table based structure that is also used in TrueType and OpenType fonts and are often referred to as sfnt-based fonts. The WOFF is the melding of the proposals for a standardized WebFont format brought forth by Erik van Blokland and Tal Leming. The WOFF does not offer any new behavior compared to TrueType and OpenType fonts (besides compressibility) and does not require special code that is not already provided within CSS (Kew).

John Dagget, a contributor for Mozilla, notes some key differences between WOFF and TrueType and OpenType fonts. First, the compression of the WOFF allows web designers to optimize the size of fonts used on their pages. The compression scheme is lossless, which means the uncompressed data in WOFF will match the data of the original OpenType or TrueType font on which it is based. Web designers can also use HTTP compression, a feature of some browsers and servers that allows data to be compressed before it is stored on a server for bandwidth optimization purposes. This is simpler to use and does not require access and knowledge of the server configuration the website is hosted on. Although the WOFF is compressed, it is not encrypted and thus should not be considered a secure format for use in regulating and controlling its use. The second key difference is that the ability to embed metadata in the WOFF font files allows font vendors to attach information related to font usage. The metadata does not affect the performance of the WOFF, but font utility tools can use the information to determine the source of the given font for usage and tracking purposes. (Dagget)

The @font-face CSS property

The @font-face property is one of the newest properties of the experimental CSS level 3 (CSS3). The complete proposed specification for CSS3 is published on W3C's website. The @font-face property allows for web browser to automatically download, link, and activate fonts that are stored on a website server. This allows web designers to be free from the constraints of a limited list of available fonts. Any font that a designer chooses can be rendered consistently by any browser that supports CSS3. Descriptor properties are used to define the font family name as well as the location of where the font is stored on the website server (Sheppard).

An example of the `@font-face` property is as follows:

```
@font-face {  
    font-family: BigCheese;  
    src: local("BigCheese"), url(BigCheese.ttf) format("opentype");  
}
```

The two required descriptors are `font-family` and `src`. The value of `font-family` will be used throughout the rest of the style sheet when it is referenced for other properties, so giving it the same name as the name of the font is advised. For the `src` descriptor, the `local` value is used so that in the case that the local user has the font already installed, the browser will not download the same font located on the website's server. The `url` and `format` value give the location of the font on the server and the font format. It should be noted that WOFF is currently only supported Mozilla Firefox 3.6., Google Chrome version 5 and above, and the beta version of Internet Explorer 9. Embedding OpenType and TrueType font formats is supported on current browsers including, Firefox, Internet Explorer, Safari, and Opera (Sheppard).

Håkon Wium Lie, a member of the W3C CSS Working group, notes in his article 'CSS @ Ten: The Next Big Thing,' that designers will "be tempted to adjust more properties than just `font-family`." Adjusting additional properties in addition to the `font-family` property might look good to the designer designing the webpage, but given the convoluted results of each web browser's rendering capabilities, it is not recommended (Lie).

Licensing WebFonts

One of the biggest issues surrounding the WOFF, and the `@font-face` CSS3 property is that there is no digital rights management (DRM) defined in the specifications. This means that it exposes font files to anyone browsing a website using the `@font-face` property. Font foundries are a bit uneasy about the `@font-face` property because they either have to hope that web

designers are trustworthy enough to pay for fonts even if they are completely accessible, or wait for some kind of digital rights management system that will protect the copyrights of fonts (Typekit).

There have been some online WebFont delivery services like Typekit and Kernest that allow web designers to subscribe to a service and link to fonts hosted on the vendor's site. This method of using WebFonts allows web designers to use the power of WebFonts while protecting the work of type foundries and type designers without resorting to bloated and ineffective DRM software. For web designers, there are still drawbacks to this solution. WebFont vendors like Typekit are a paid subscription service, which means that web designers have limited access to link to WebFonts, and often have bandwidth limits. If a web designer's site goes over the bandwidth limit, the WebFont vendor will charge extra or block access to the font and the site will revert back to whatever default font is set in the CSS and/or web browser. There are some online type delivery services like Kernest that are not only free but also serve fonts in WOFF (Fontshop).

The End User License Agreement (EULA) plays an important role in the debate between font foundries and web designers over whether fonts should be able to be used as WebFonts for use in web browsers. The EULAs that are provided with copyrighted fonts state the terms in which the end user can use a licensed font. Font foundries can state that designers can use the font however they wish, or limit the end user's scope of using that font. This includes the use fonts as WebFonts and using the `@font-face` property in web page code. Many online font vendors like FontShop are realizing that licensing their fonts for use over the web is a viable market and are allowing end users to purchase and download fonts in WOFF and use the `@font-face` property (Fontshop).

One of the most insightful recent events that dealt with the issue of WebFonts and licensing happened at TypeCon2009 in Atlanta during the WebFonts panel in September 2009. There were a total of 11 panelists, ranging from a lawyer to a web designer to type designers and font vendors. Coverage was taken from audio recorded at the conference which was then transcribed.

The panelists included:

- Moderator: Kent Lew *type designer, SOTA Board Member*
- Ted Harrison, FontLab *type design software vendor*
- Bill Davis, Ascender (*font vendor*)
- David DeWitt, Monotype Imaging (*font vendor*)
- Christopher Slye, Adobe *type designer*
- Shu Lai, ShuDesign *web designer*
- Ivo Gabrowitsch, FontFont *font vendor*
- John Hudson, Tiro Typeworks *type designer*
- Bryan Mason, TypeKit *web font service provider*
- Garrick Van Buren, Kernest *web font service provider*
- Frank J. Martinez, Esq. *copyright attorney*

What was supposed to be a calm forty-five minute overview of the current state of WebFonts turned into a heated two hour discussion over licensing issues. Shu Lai, the only web designer on the panel, remarked that web designers have waited long enough to use something other than system fonts on the web. John Hudson, a type designer, then went on to reply that font vendors are not only concerned about protecting their fonts, but also the companies and newspapers who own proprietary typefaces. Bill Davis of Ascender is a proponent of the Embedded OpenType (EOT) format, which removes URL binding for increased security. Unfortunately EOT is only implemented in Internet Explorer and is only supported by Ascender. Frank Martinez, the lawyer on the panel, mentioned that there has not been a lot of case law for DMCA (a United States technology copyright infringement law) related to font foundries. David Dewitt of Monotype said that they would be willing to offer compression technology for EOT if the W3C accepted it, but

with the proposal of WOFF it does not look likely. Hudson noted that while users may not mind the added typographic style WebFonts offer, they would not want to wait for a two megabyte font to load. Lai then remarked that web developers will eventually get rid of any drawbacks that WebFonts have just as they did with image compression, and that optimizing fonts for the web will provide an opportunity for font vendors and designers (Davis, DeWitt, Gabrowitsch, Harrison, Hudson, Lai, Lew, Martinez, Mason, Slye, van Buren).

There were also some interesting points about different WebFont formats and usage. Bryan Mason of TypeKit noted that because they serve the fonts, they can compress and serve the font ready-to-use for the web designer. Garrick van Buren also added that the Internet culture is more accustomed to linking to 3rd party services for content (music, video). While this may seem convenient, Lai acknowledged that the online font services like TypeKit are merely offering a stopgap solution which would not be viable in the long run (Davis, DeWitt, Gabrowitsch, Harrison, Hudson, Lai, Lew, Martinez, Mason, Slye, van Buren).

The panel also discussed the disparity in current licenses compared to new rental fees like TypeKit. Mason from TypeKit responded by saying that they do not provide special licenses, and they try to make their prices comparable to those charged by foundries. He also admitted that they were still developing their pricing model and that they were seeking feedback from other type foundries. Davis chimed in to say that Ascender was already offering WebFont usage in their licenses. Martinez added some legislative expertise and pointed out that for custom fonts, users should be expected to pay for this specialized service, and Hudson pointed out that the key to making this known was to educate users on the copyrights behind typefaces. Both Harrison and Gabrowitsch said that they would be happy to support whatever standard is accepted by foundries, but when it came to using font users already own, they both believed that there should be

separate licenses and products (Davis, DeWitt, Gabrowitsch, Harrison, Hudson, Lai, Lew, Martinez, Mason, Slye, van Buren).

Hudson pointed out that until a WebFont format is supported by all major browsers, that there is no webfont format, and that EOT seems like an attractive format now because it fully developed and provides some security compared to raw font linking where any user can pull the font off the web. Bill Davis remarked that since EOT is already available, it could become the standard format within a matter of months if the other major browsers besides Internet Explorer add support for EOT—Firefox, Opera, Safari, Chrome. Christopher Slye of Adobe agreed with the fact that any format other than raw font linking should be the solution, and that they'll keep trying new ideas until something works. DeWitt called out the foundries and said that if they did not already have licenses that address web usage, they need to get on that as soon as possible. By not having licenses that address web usage, foundries are missing out on potential revenue. Hudson then closed by saying that the situation of choosing a WebFont standard is not an either or, but rather a situation of foundries supporting one more than the other. Hudson also pointed out that if foundries put more weight behind a single format that it will influence which format will have a greater chance of becoming the standard (Davis, DeWitt, Gabrowitsch, Harrison, Hudson, Lai, Lew, Martinez, Mason, Slye, van Buren).

Summary

The beginning of web typography was given to provide reasons behind the need for the separate rules for web typography. Then a brief explanation was given about the W3C and their methods in gaining a consensus of web standardization. The W3C was largely responsible for giving support for CSS which provided several advanced typographic controls. The `@font-face` was developed as part of CSS3, and is the CSS property through which web developers can display

almost any font on their websites on any browser that supports CSS3. With the development of the WOFF and WebFonts, there has been debate over how end users should use fonts that are licensed from font vendors. There have been different approaches to this dilemma, including foundries altering their EULAs for web use, and the startup of brand new online subscription based font services.

Chapter III: Research Methods

Web typography has been around for a long time, but it has only been recently that a possible candidate for a standardized WebFont has been proposed. This will not only open nearly limitless opportunities for web designers, and will allow all users of major web browsers to experience those websites with the web designer's original intent. The purpose of this study was to prove that WOFF is a worthy candidate proposed by the W3C for WebFonts.

In order to confirm the hypothesis that WOFF provides a viable future for web typography, some research needed to be done. The concept of WebFonts however is not a subject which can be studied with the Scientific Method. Dr. Harvey Levenson writes in his book *Some Ideas About Doing Research in Graphic Communication* that the practice of "repeatability and verification of research is only achievable when variables are completely controllable by the researcher such as when dealing with inanimate variable." Levenson also states that, "when introducing variables such as how people perceive or react to technology, other methods must be used. For some

research that takes place outside of the scientific laboratory, the Scientific Method is not the best choice” (Levenson).

While the Scientific Method may not be suitable for researching this subject, there are other methods that were used to conduct this study. This study will use elite and specialized interviewing, historic research, and content analysis to determine whether WOFF is a viable solution for the standardization and advancement of web typography.

Elite and Specialized Interviewing

Elite and specialized interviewing is a method of interviewing developed by famous communication theorist Walter A. Dexter. Elite and specialized interviews are conducted when the interviewees are “people who view themselves as important, such as professionals and executives,” and that the method is used to maximize the collection of useful information in applied research (Levenson).

Levenson also writes that elite and specialized interviewing is a procedure that “requires precise, open-ended questions, but questions that are open to refinement as the research and interview continues.” The goal of elite interviewing is to provide “comprehensibility, plausibility, and consistency, not duplication of responses.” The interviewer also becomes a part of the research team by establishing rapport with the respondents, after which the interview takes the form of a conversation (Levenson).

With the particular content of my research, the subjects for interviews had to be familiar with the concept of WebFonts, and so professionals and professors who were knowledgeable about WOFF and WebFonts were chosen. To remain as consistent as possible with the interviews, subjects spanning the broad range of those involved with web design, WOFF, and WebFonts were chosen. Among those interviewed were:

- **Garrick van Buren** President of Working Pathways, Inc. a web application strategy and design company. He has assisted companies like Sun Microsystems, Target, Orbitz.com, and several start-ups in developing and maintaining a customer-centric web presence. He is the co-founder and a contributor of MNteractive.com and PodcastMN.com. He is the creator of Kernest, the first WebFont licensing service.
- **Ralf Herrmann** web designer founder of Opentype.info that discusses topics on typography, WebFonts, signage, and wayfinding. He is the author of several typography books and publisher of German typography magazine *TypeJournal*
- **Erik van Blokland** Dutch type designer. Started the LettError virtual type foundry with Just van Rossum, with whom he worked at MetaDesign. Fame came with the release of Beowolf (co-designed with van Rossum), a font whose ragged edges shift randomly each time you print the font. Another font of his, Kosmik, has a version that flips between three alternates for each character for a friendlier, hand-drawn feel. Most of his fonts are published by FontFont. He is a key developer on the Robofog project with van Rossum and Petr van Blokland.
- **Tal Leming** Type designer, lettering artist and type technology specialist living and working in Baltimore, Maryland. Founder of Type Supply where he focuses on developing original typefaces and lettering while pushing the boundaries of type technology. Leming's typefaces have been seen on screens large and small, in magazines and newspapers and on everything from packages to clothing. His work has won numerous awards, most notably his typeface United was included in the

Smithsonian Cooper-Hewitt, National Design Museum's National Design Triennial in 2003.

- **Bill Davis** has over twenty years experience in the graphic arts and font software industry. In charge of marketing and business development at Ascender Corporation, a WebFont service and provider based in Chicago, Illinois.
- **Christopher Slye** joined the typographic staff at Adobe in 1997, where he has helped to expand the design and functionality of Adobe Originals typefaces. He continues to assist with design and production of Adobe's growing library of typefaces.

The questions in the interviews were all designed to get an in-depth, informed response on the subject of the viability of WOFF and WebFonts:

- Now that WOFF has been proposed by the W3C as the standard format for WebFonts, how do you see the advancement of web typography at this point?
- What are some of the distinguishing characteristics of WOFF?
- What will it take for WOFF to be confirmed as the Web standard for WebFonts?

With WOFF being a new development in web typography, there might be a greater chance of obtaining the initial views of professionals involved in the industry that will provide strong points on the subject of the viability of WOFF. So research was conducted on the opinions of those professionals involved with WOFF—web designers and developers, and type foundry professionals.

Content Analysis

Content Analysis as described in Harvey Levenson's *Some Ideas About Doing Research in Graphic Communication* is one of the most popular methods used in communications research. It is a method for quantifying qualitative information gathered from elite and specialized interviewing, historical research, and descriptive research. In other words, content analysis is often used in combination with other research methods in developing results and drawing conclusions (Levenson).

Sampling is a technique used in content analysis to extract information from the views of different people. Coding units such as words must be established before content analysis can begin. The theme or assertion is one of the more common units used. Coding must only involve content that is relevant to the hypothesis. A direction such as "favorable," "neutral," and "unfavorable" can be assigned to a sentence as a coding unit (Levenson).

Coding Units for the Content Analysis

To be able to quantify the research done in elite and specialized interviews and historical research and apply them to the hypothesis of this study, keywords of the responses in the Elite and Specialized interviews and historical research were used as coding units. Words that were negative in relation to the question were given an unfavorable value and a (-1) was assigned. Positive words in the responses were defined as favorable and given a value of (+1). Neutral responses were given a value of (0). After determining the values of each person's response to each question, the totals of favorable, unfavorable, and neutral responses were added up. By using this system for content analysis a conclusion could be made from the interviews that would support the hypothesis of this study.

Content Analysis for Elite and Specialized Interviewing

After conducting the interviews the responses were thoroughly analyzed and developed into quantitative results that could be used to concretely describe and confirm the hypothesis of this study. The responses were categorized as positive, negative, or neutral in relation to the question asked, and so each question could have a quantitative response that could be used to help confirm or deny the study.

Chapter IV: Results

Ralf Herrmann

When first asked about how the advancement of web typography would progress after WOFF was proposed as the W3C standard format, Ralf Herrmann didn't think a new format was necessary all. He said that WOFF was a concession to the commercial font vendors which don't accept their regular print fonts being used on the web. Herrmann said that there is not much that WOFF offers that wasn't possible with other currently available font formats like EOT, TTF/OTF that can be used on the web. Herrmann did admit that everyone can profit now that font foundries, browser makers and the W3C are working together on WOFF and its implementation.

Concerning the technical aspects of WOFF, Herrmann pointed out several key characteristics. He said that in contrast to True-Type and True-Type-flavored OpenType fonts, WOFF offers built-in compression, which makes the delivery of WOFF much faster. That is, the smaller file size of

the WOFF can be loaded and rendered in a browser faster than uncompressed WebFonts.

Hermann also noted that WOFF offers the inclusion of optional metadata but currently isn't being utilized by font vendors. He said that the only negative aspect of WOFF was that it doesn't offer backwards compatibility with older browsers (which other font formats like EOT-lite offered).

When asked what it will take for WOFF to be confirmed as the Web standard for WebFonts, Hermann replied that there is no stopping WOFF now. He said that all browser makers are working on support and it will certainly become THE webfont format. Hermann said that we just need to wait a couple of years until older browsers that don't support WOFF are no longer in use. But until then webfont services delivering other font formats like EOT/TTF/SVG that are supported by older and newer browsers are a good solution.

Erik van Blokland

When first asked about how the advancement of web typography would progress, Erik van Blokland said that after WOFF was proposed as the W3C standard format, it started the process of becoming the only W3C supported, interoperable format for fonts. He said that individual browsers may support other formats as well, but in order to be compliant to W3C standards (and they all want to be, these days) they have to support WOFF. He also pointed out that all major browsers and platforms are adding WOFF support. IE9, Firefox, Opera, Webkit (and subsequently all apps based on that). On a low level interoperability means that it should be enough to serve one font and have it perform in all browsers. Having one font file to work with exposes all sorts of differences between browsers and operating systems. This is not a flaw of

WOFF, but rather something that it enables. The fact that designers can now compare the same page with the same CSS and fonts in different places will work as an evolutionary force; it makes text rendering a thing to compete on.

An important point that Erik van Blokland mentioned was the fact that type designers and type foundries are being acknowledged as stakeholders in the WebFonts discussion. For example, from a Safari 3 press release in 2008 it was stated that “now you can use any font you want” (<http://typophile.com/node/43971>). Now it’s stated in specifications that fonts have to be properly licensed. He repeatedly said that this change in the way WebFonts were being discussed was a big deal personally as well as for WebFonts in general.

Several aspects of WOFF both positive and negative were pointed out by Erik van Blokland. One of the positive aspects Erik emphasized was the compression offered by WOFF. In his own testing, regular OpenType fonts (both CFF and TT flavored) can compress anywhere between 40 and 47 percent. For a website resource like a font that will be loaded for every page, this means a lot. The EOT-lite proposal has compression as well, but can only compress fonts that contain hand-crafted hints and only a 30 percent reduction in file size.

When it comes to increasing the exposure of WebFonts, Erik van Blokland believes that serving WOFF as part of the web content will help to increase awareness. This is not limited to WOFF but also true for any WebFont solution. This will make it easier to use fonts in places where they’re not licensed to be. He has noticed some indications that there enough web sites, designers, and developers interested in doing the right thing. He said that he is remaining hopeful, but the issue of incorrect font usage is still a pressing concern. He mentioned how the type industry went through a digitization in the mid-eighties and experienced problems similar to what the movie and music industry are experiencing currently. Most fonts today are made by small companies and

independent designers. A complete font family with all the various weights and language supports easily runs up to 50,000 glyphs, which takes about two to three years of development. He said that does not leave any extra room to maneuver and there is no venture capital for type development.

Erik said he was interested to see fonts-as-services as technical solutions to current and legacy browser incompatibilities, but does not think that the business model of these services promote will not be sustainable to new type development. When looking at an overview for web service companies (<http://sprungmarker.de/wp-content/uploads/webfont-services/>), there are a lot of mouths to feed. Erik did not want to make any predictions about where this goes, but the good thing was that new models are being tried.

When asked what it will take for WOFF to be confirmed as the Web standard for WebFonts, Erik van Blokland said that the W3C has a well established process for making these things work. Most of the current work on the specifications for WOFF is about the details since all of the technical stuff is clear and already being implemented in browsers and tools. W3C does not want developers to wait for the process to be finished, and actually encourages developers to start using and working with WOFF as soon as possible. Van Blokland said that support is seen as encouragement to move the process along and take it to the next level. And even though WOFF is not an official W3C recommendation yet, WOFF support will be showing up on all major browsers and platforms very soon. Van Blokland was not personally familiar with the W3C methods of building things like the WOFF specification, but he was really impressed. The amount of experience that shows through in how they organize the work is tremendous, and he said it was interesting to see the W3C's process (http://www.w3schools.com/w3c/w3c_process.asp) up close and in action.

Tal Leming

On the subject of how web typography would advance from this point in time, Tal Leming believes that we are witnessing the (re)birth of web typography. Leming referred to the fact that he always worked around the limitations of WebFonts in the past, and was never really happy with suggesting fonts that he only sort of liked, or one that he can live with that covers way too broad a category of font styles. Leming said he and all other designers are gaining the ability to specify exactly what font they want to use, and is hoping that the CSS3 font-variant options will be expanded to enable vastly more sophisticated typesetting.

There are several points Leming made about the aspects of WOFF. He thought the biggest positive thing about WOFF is that there seems to be very little disagreement about its necessity and its ability to solve a swath of problems. It addresses the needs of many groups: the font makers, browser makers, web developers, and most importantly all people who use and read content from the Web every day. Leming stated that font makers are getting a move away from “raw fonts” being used on the web and hopefully some new information display in browsers. Browser makers are getting a simple standardized font format in WOFF that they can easily implement. Web developers are getting fonts. Readers are getting a whole new spectrum to look at. Leming believes WOFF is a win for everyone. He did admit to being a bit biased and did not have any negative things to say about WOFF. Though on a more general level, Leming admitted that there has to be ways to make CJK (Chinese/Japanese/Korean) fonts less bandwidth intensive. Japanese, Chinese, and to a lesser extent, Korean use a substantial number of characters. This huge array of characters results in some very large fonts. Large files mean long download times, and Tal feels this problem needs to be solved. Leming did mention that there are some smart people

working on this. WOFF has some tricks to offer, such as per-table compression, and Leming believes that that will hopefully be part of the solution.

When it comes to what it will take to make WOFF the confirmed web standard for WebFonts, Leming's answer was concise: use. He said that this was a big issue that font makers like himself were facing. Some of the questions he always asks himself are do people want to use specific fonts on their websites? If we believe the commotion on the Internet, yes. Do these people want to pay for using the fonts? That is something Leming admits that is yet to be seen. If fonts are not licensed they will not be used, and if they are not used then WOFF was not necessary. Leming says he is an optimist, so his opinion is that fonts will be licensed, used, and the web will look very different in the near future.

Garrick Van Buren

Garrick Van Buren says that he has served WOFF files with Kernest to Firefox since October 2009. He has added WOFF into the WebFont optimization workflow at Kernest, although he has not seen any significant benefit to WOFF.

The major aspect of WOFF that was pointed out by Van Buren pertained to file size. Font file sizes relative to audio or video are tiny, and the vast majority of the fonts Kernest serves are 20–40 KB. Van Buren said that the file sizes of WOFF and OpenType fonts are often identical and sub-setting fonts to contain fewer glyphs and simplifying the outlines of a font's glyphs provides greater optimization and compatibility than to save to a newer format.

Browser support was another issue that Van Buren mentioned. Modern browsers support a number of formats for all different content types. For text, this is HTML, RTF, XML, plain text, and whatever else browser vendor want to support. For graphics: GIF, JPG, PNG all have some

degree of support across browsers. But not all features of all formats are supported across all browsers. For audio formats the same story – MP3, AIFF, WAV – also have different degrees of support depending on the browser. Today, Van Buren said that this is not the case for WebFonts. Mozilla support TrueType, OpenType and WOFF font formats. The WebKit engine (used for Safari and Chrome) and Opera’s engine support TrueType, OpenType, and SVG. Internet Explorer only supports TrueType-based EOT fonts.

Just like support for file formats in other content types, Van Buren pointed out that not all features of all WebFont formats are supported across all browsers. Nor is all of the existing W3C’s specification implemented across all browsers. Supporting any W3C specification is up to each specific browser vendor, what their priorities are, and how much resources are available to them. Van Buren also mentioned well adopted web technologies (RSS, JSON) that were never part of any W3C specification.

When asked when WOFF will be confirmed as the standard for WebFonts, Van Buren replied with a vague “sometime after tomorrow.” But by that time, he said that all browsers will understand multiple font formats just as they understand multiple formats of other content types. He believes this is a long term win for web designers since they will be able to work with whatever font format they choose—if only because Internet Explorer 6, 7 and 8 will be with us years after WOFF-supporting IE9 is released. But until then, He said that he and Kernest will continue to optimize, generate, and serve the several different WebFont formats available today.

Bill Davis

Being part of the Ascender Corporation, Davis’ insight into WebFonts and WOFF was unique in that it was from his own perspective on the industry side of WebFonts. He recalled when the

discussion around different WebFonts began around two years ago. Some of Davis' customers began working with Microsoft and Internet Explorer 8 (IE8). IE8 had for a couple years prior supported the proprietary EOT (embedded OpenType) font format which used patented techniques like a specialized compression. During this time Davis said that Monotype and Microsoft began discussion to make the EOT format a formal standard. This discussion spread further to more font and browser companies in trying to figure out the best format for WebFonts. Out of the discussion some complaints about EOT started surfacing, mostly about the restrictive qualities of all the patents surrounding EOT. Some of the features people did not like was the proprietary compression and url binding (where a Webfont would only work with certain specified web sites), and a new format was formed called EOT-light which did not have all the problematic features EOT had.

Around the same time of the development of EOT-light, Ascender started support for WOFF. Safari also became the first browser other than Internet Explorer to support WebFonts, but was limited to TrueType fonts, which Davis thought was not suitable for the web. He said that there needed to be a better font format for linking and embedding fonts on the Web. Davis was actually involved in the process of coming up with techniques that were developed to allow support for different WebFonts formats including EOT, WOFF, TrueType and SVG (which is used in some mobile device browsers like the iPhone and iPad). Part of Davis' WebFont offering allows web designers to link to WebFonts as a service, where all the files and code are provided on company's end. In January of 2010, Davis started licensing WebFonts through Ascender.

When all the major browsers add support for WOFF, Davis said it will be easier for web and type designers to start using webfonts and not have the issues of working with the different WebFont formats. He pointed out the fact that WOFF is interoperable, which means that with generating a

single WOFF file, it will be supported by all operating systems and all browsers. This interoperability that is an inherent trait in the WOFF is allowing everyone to create a standard WebFont format that everyone is working toward. As more browsers support WOFF, Davis said that it will allow a more rapid adoption by web designers, where it is going to open up a lot of opportunities for web designers and developers to use a more creative typographic palette.

Another point Davis brought up when discussing WebFonts was the issue of licensing and usage. He referred to this issue as a moving target that was often confusing for web designers and developers. Every type designer and foundry often has different licenses with slightly different uses for desktop fonts that are used for print. Davis said that WebFonts are not as complex because they are in an early stage in the market, but there are still different business models and licenses for WebFonts. Davis pointed out that very few of the commercial desktop fonts people have on their computers have licenses rights that allow them to be used on the web. Those desktop fonts were designed for print to create printed document, and their licenses reflect this usage. With new Webfonts that are coming out, their licenses specify how they can be used on the Web. General annual one time license fees are emerging, as well a subscription basis license. So web designers and developers can put WebFont files on their own web server, or allow the WebFont provider to host a service that keeps and maintains the font. Davis said that the hosting service is mainly aimed at smaller websites because it is easier for the customer to subscribe to a service, add just one line of code, and have the WebFont linked automatically. Larger sites with a million or more visitors usually want to control their site assets (including fonts), so there is also the option for larger sites to host their own fonts.

In discussing what it will take for WOFF to be confirmed as the WebFont standard, Davis replied that it already has the stature of a standard since it has already been proposed by the W3C. He said

that everyone is working toward WOFF as a standard, and that more people are going to pay attention to it because of this.

Quality was another issue that Davis touched upon. When looking at fonts through the medium of the Web—they are merely pixels on a screen unlike high resolution print products. There is a noticeable difference in printers with 1,000 or more dots per inch (dpi) and the 72, 120, or sometimes 200 dpi resolution of a computer monitor. The big challenge for type designers will be finding a way to render fonts at this lower digital resolution. A task often associated with font providers like Ascender is helping designers use fonts that look across all platforms and screen sizes. Some of the web safe fonts like Verdana and Georgia are deemed safe for the web not only because they work across most operating systems and browsers, but because they look good and consistent across all sizes. Sometimes fonts that seem like good quality will look spindly or not as crisp when viewed at smaller sizes, and this is an issue that is present because the WebFont market is at a fairly early stage in its life. Davis said that all fonts, including WebFonts, have a certain expectation of quality, and it will be interesting to see how fonts are redesigned and reengineered so that they look good on all computer screens.

Christopher Slye

Although Christopher Slye has worked for Adobe for nearly 13 years, he just began to work with WebFonts around two years ago when browsers started introducing the ability to link and render web enabled fonts to a website. TypeKit, one of the proponents of providing WebFont services and was one of the several options Adobe was considering becoming partners with. Adobe deemed TypeKit to be a good up and running company they offered a good service. Not too long ago Adobe and TypeKit officially became partners, and opened up the inevitable result of offering Adobe fonts for use as WebFonts.

WOFF and Slye are definitely not strangers; around the time of this interview, Slye had just gotten back from a meeting with the W3C in France concerning WOFF. He mentioned the importance of WOFF being a single interoperable format. Before WOFF there was no single WebFont format that worked in all browsers, and the WOFF proposal was designed to fix this problem. Assuming that this process of standardizing WOFF follows through, Slye said that it will be easier to offer fonts in WOFF. Developers will have a single format and will not have to do format checking in different browsers.

The issue of licensing was brought up, and Slye said that Adobe's take on licensing is that foundries are put in a difficult situation to make fonts available for web usage. Most font licenses, he pointed out, only cover concrete usage. That is, for print and embedding into PDFs. Using fonts on the web is different compared to this concrete usage, where WebFonts are exposed and used on web pages. Slye said it is up to type foundries to decide how they want to license fonts for the web, and can do it in two ways. The first way is to provide a service similar to what TypeKit does, or sell the actual font file and let people host the font themselves. One aspect of wanting WOFF as a web standard is that it is an alternate font format specifically for the web that does not work as a desktop font. This will prevent most people from taking an unprotected file off of a site and using it as a desktop font, and is basically a way for foundries to protect their intellectual property. Slye said it is ultimately the decision of the foundries and font service providers to approach this licensing issue, since it is also a business issue. It depends on how comfortable they are in selling their fonts for web use, and whether they want to sell the font directly or provide a service.

The process of WOFF becoming the standard for WebFonts is already happening now, and Slye says there are about a dozen or so WebFont services with the majority of them serving WOFF

files. The specifications for the WOFF format have already been made. Anyone can go to the W3C's website and see the specifications for themselves—they are real. Although Slye does not believe that there will be a rapid acceleration of WebFonts once it is an official standardized W3C recommendation, there will still be a consistent linear increase in the usage of WOFF once that does happen. And with the array of WebFonts being made available from foundries selling licenses to free fonts with open licenses, there are various ways to utilize WebFonts. Slye finally said that there are new sites appearing almost every day that are using WebFonts, and is something that will be more noticeable as time progresses.

Interview Results and Analysis

Interviewee	Question 1	Question 2	Question 3
Ralf Hermann	0	+1	+1
Erik van Blokland	+1	+1	+1
Tal Leming	+1	+1	+1
Garrick Van Buren	-1	0	+1
Bill Davis	+1	+1	+1
Christopher Slye	+1	+1	+1
Overall Value	+3	+5	+6

Table 1: Quantified Interview Results

For the first question on what was thought of the current state of web typography and how it would progress, there were varying answers. Ralf Hermann's reply was fairly neutral in that he

did not see it as necessary but saw the potential opportunities for type designers and foundries.

Erik van Blokland's response was more positive in saying that the W3C was instrumental in progressing toward recommended standard for WebFonts. Tal Leming's answer was quite positive and even stated that WOFF is part of a new rebirth of web typography. Garrick van Buren's response was a little more negative in that he saw more of an advantage in optimizing the actual font glyphs for file compression instead of relying on a new font format. Bill Davis believed that although EOT-light offered the same technical benefits of WOFF such as file compression, having the comprehensive agreement between major browsers, web designers and developers, and type designers and foundries was a positive aspect of the WOFF proposal and a positive direction for web typography to go in. Christopher Slye's direct involvement with the W3C and the WOFF proposal made it obvious that he was a strong supporter of advancing web typography.

In discussing the second question of the distinguishing characteristics of WOFF, Ralf Hermann's response was mainly positive in that he saw the benefits of the built-in compression (and thus faster loading times), and potential use in WOFF's metadata feature – both of which outweighed the negative characteristic of not being backwards compatible with older browsers, and a problem that would be solved on its own as older browsers are phased out. Erik van Blokland again pointed out the positive aspect of superior file compression. Tal Leming stressed that the collective agreement between all the circles of people in type, web, and browsers is what makes WOFF so fundamental in have a Webfont standard. Garrick van Buren's answer was a little more neutral, and saw WOFF as part of the evolution of web typography—just as the way audio and image formats evolved and were eventually supported by most major browsers. Bill Davis pointed out that not only is WOFF interoperable, but the increased attention due to the WOFF proposal will give web designers more opportunities to create more engaging and creative content by

utilizing WOFF. Christopher Slye again stressed the importance of the interoperability of WOFF, and from a developer's standpoint means that WOFF will cause less problems caused by inconsistencies of different browsers, operating system, and font formats.

When talking about what it will take for WOFF to finally become a W3C recommended standard for WebFonts, Ralf Hermann's response was that it is inevitable at this point since all major browsers are working on supporting it, and the only thing that is needed is patience to wait for everyone to start seeing WOFF as the WebFont standard. Erik van Blokland remained eager about the way the W3C follows through with their process of developing standards, and pointed out that the main specifications for WOFF are already published, and that browsers are already working on supporting it. Tal Leming's response was optimistic in that the buzz created by type and web people is a good sign of support for WOFF. Garrick van Buren was also optimistic about WOFF being part of the progression of web typography, and that with the evolution of WebFonts and the natural phasing out of various font formats, type designers and foundries will be able to work with WebFonts for a long time. Bill Davis saw the W3C proposal of WOFF as giving it the stature of a standard, and he remains curiously optimistic to see how the increased attention and focus on quality progresses. Christopher Slye saw WOFF becoming a standard as already happening, and pointed out how it was already real and tangible—all the sites sprouting up that are utilizing WOFF are proof of this.

Chapter V: Conclusions

With written language, people can effectively communicate to others on a much larger scale than a face to face conversation. Anyone can share their ideas, stories, and thoughts with whomever they choose. And with the advent of the Internet, people can effectively communicate around the world in ways that were unfathomable before. Instead of people writing letters and waiting to receive a response, they can instantaneously share information over the Internet to potentially millions (billions?!) of people. That is a lot of people.

With the ease of sharing written information over the internet also comes the seemingly overwhelming wall of text that is often encountered when reading from a computer screen. If that wall of text is something required for research, school, work, or really anything that a person feels they need to know—the information is most often masked in a bland, uninteresting method of presentation. It makes reading and learning from a computer screen a necessary and sometimes daunting chore. But what if that text was thoughtfully placed on a website with a nice, clean font?

WebFonts allow web designers and developers to create thoughtful, attractive, and inviting websites that present information clearly and effectively without overwhelming people with a wall of text. A certain font can be used to convey a certain feeling or mood, and help give text shape and color in an otherwise black & white world. The internet is certainly important because it gives people information at speeds and magnitudes that are not possible with any other form of written communication. Why would people settle for communication with little or no feeling or character? WebFonts allow information to have as much distinct character as any written printed document, without the limitations of the web safe fonts that people see every time they visit a website that uses them. Webfonts do not just make reading text on websites more interesting and good looking – they have their intrinsic benefits as well. They are more searchable, accessible/scalable, smaller, and faster than loading images that might not even render correctly. It is real text that you can touch (with your mouse pointer).

With the proposal of the WOFF, the W3C has effectively started a revolution in web typography. With everyone involved in the standard making process—the browser companies, type designers and foundries, web designers and developers, even normal internet users—WOFF was the WebFont format that everyone agreed upon and is working towards. Although some are not adamant about its backwards compatibility, simply waiting until the older more archaic browsers are phased out would solve this problem. What is clear is that WOFF is a concrete solution to the long running issue of web designers and developers having limited control over their typographic content. And once more people see the potential WOFF offers, support for it will continue to grow.

Just by looking at the results of the interviews in this study, the amount of support and enthusiasm for WOFF is strong and clear. Type designers and foundries like WOFF because it offers superior

compression, and because it gives them the promise of future work. They will continue to focus on making distinct high quality fonts that can be used on the Internet for years to come as all the WebFont formats are naturally phased out and WOFF is left standing. Web designers and developers like WOFF because it is easy to work with and interoperable, making it less prone to problems. It also gives them more opportunities to present information in ways other than walls of text. Together they will make written web content that is enjoyable to read, giving life to text that was once lifeless. The people that have worked with WebFonts and WOFF are treating WOFF as though it is already the standard, and is evident in the support by all major browsers, the business models of type foundries and designers, and the support and optimism of web designers and developers that are creating new sites every day that are utilizing WOFF. If all of this evidence is any indication, WOFF is indeed a viable WebFont solution whose support will continue to grow as more people read about it.

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